

## Chapter 6 – Adolescent Health

Adolescence marks the transition from childhood to adulthood, a critical period in the life course. Health issues of particular importance to adolescents include injury from motor vehicle crashes, suicide, teen pregnancy, sexually transmitted infections, and behavioral risk factors including smoking, poor diet, and lack of physical activity, all of which can influence the development of chronic disease later in life.

### Section 1: Health Status

Both nationally and in Colorado, measures of general health and well-being for adolescents are consistently positive. In 2005, 93 percent of Colorado students in grades 9-12 who were attending public schools reported that their health, in general, was good, very good, or excellent, regardless of race/ethnicity and similar to national data.<sup>1-2</sup> These results were similar to those reported by parents of Colorado youth ages 12-17 years old: 98 percent of parents reported that their child's health was good, very good, or excellent on the National Survey of Children's Health in 2007.<sup>3</sup> In terms of oral health, 94 percent of parents of Colorado youth ages 12-17 reported that their child's teeth were in excellent, very good, or good condition, comparable to national figures (92 percent).<sup>3</sup> In terms of the number of school days missed due to illness, the percentage of U.S students who did not miss any school days was statistically higher at 24 percent, compared to only 18 percent of Colorado students who did not miss school.<sup>3</sup>

### Contributors to Good Health

There are many social determinants of health that directly influence a person's behavior and also predispose them to certain health conditions. Some of these determinants can be characterized as "personal" and others as "community" assets. The more positive assets a person experiences or exhibits, including those that are supported by others, the more likely an individual is to engage in healthy behaviors and demonstrate better health status overall.

#### Personal Assets

Overall adolescent health status includes social and personal assets along with general physical and mental health. Ninety-four percent of Colorado youth ages 12-17 years old exhibit positive social skills.<sup>3</sup> Students who feel connected to their schools are less likely to engage in health risk behaviors including tobacco and alcohol use, violence-related activity, and early sexual activity. School engagement was defined, in the National Survey of Children's Health in 2007, by asking: how often the child/youth cared about doing well in school and how often the child/youth did all the required homework in the past month. A total of 78 percent of youth were usually or always engaged in school.<sup>3</sup> In addition, one-third of Colorado youth ages 12-17 were involved in some type of community or service work a few times a month or more.

### Community Assets

A supportive and safe community contributes to healthy youth development and growth. This type of neighborhood can be defined as one where people assist each other, where trustworthy adults live and can partner with parents, and where neighbors watch each other's children.<sup>3</sup> In 2007, almost 85 percent of Colorado families reported that their children, ages 12- 17 years old, lived in a supportive neighborhood; 90 percent felt that their neighborhood or community was usually or always safe.<sup>3</sup>

Feeling safe at school is also important for positive adolescent health and development. While the vast majority of students reportedly do feel safe at school, there is a small percentage that do not. According to the 2009 Colorado Youth Risk Behavior Survey, 5 percent of Colorado high school students reported missing school on one or more days within the last 30 days because they felt unsafe at school or on their way to or from school. Also in 2009, 8 percent of students reportedly had been threatened or injured with a weapon on school property one or more times in the past year.<sup>2</sup>

### **Mental Health**

In 2009, 25 percent of Colorado high school students reported experiencing depression in the past 12 months, similar to the result for the U.S.<sup>4</sup> Depression was defined as feeling sad or hopeless almost every day for more than two weeks in a row, to the extent that a student stopped doing his or her usual activities. From a previous analysis of the Youth Risk Behavior Survey from 2005 for the United States and Colorado, both national and Colorado surveys found that White/Hispanic students (national – 36 percent, Colorado – 34 percent) were more apt to report depression than White/Non-Hispanic students (national- 26 percent, Colorado – 23 percent).<sup>1, 4</sup> Female students also reported being depressed more often than males. Over one-third (37 percent) of females in Colorado public high schools reported feelings of sadness compared to 14 percent of male students.<sup>1, 4</sup> Nationally, this difference was somewhat closer: 37 percent of females and 20 percent of males reported depression.<sup>1, 4</sup>

The National Survey of Children's Health measures other areas of mental and behavioral health. Based on family report during 2007 approximately 8 percent of Colorado youth ages 12-17 years old consistently exhibited problematic social behavior, defined as at least two problems in the following areas: arguing too much, disobedience, bullying or cruelty to others, stubbornness, sullenness or irritability. The survey also estimated that 9 percent of youth were taking medication for one or more of the following problems: attention deficit hyperactivity disorder (ADHD), emotions, concentration, or behavior.<sup>3</sup>

### **Chronic Health Conditions**

Approximately 28 percent of Colorado youth ages 12-17 have at least one chronic health condition, and 11 percent have a condition that is considered to be moderate or severe.<sup>3</sup> Based on results from the National Survey of Children's Health, the most common health conditions for youth this age are asthma, attention deficit disorder (ADD), and learning disabilities. Each of these conditions was found in 7 to 10 percent of all adolescents. Not surprisingly, youth with special health care needs demonstrate much higher rates of these chronic problems; close to

40 percent have asthma and 29 percent have ADD.<sup>5</sup> The prevalence of learning disabilities was not collected on the National Survey of Children with Special Health Care Needs.

### Youth with Special Health Care Needs

As reported in the chapter on child health, youth with special health care needs include adolescents who have or are at increased risk for chronic physical, developmental, behavioral, or emotional conditions that require health and related services beyond that required by youth generally. Approximately 16 percent of Colorado youth ages 12-17 years old meet the definition of children with special health care needs; this is similar to the national percentage. Males outnumber females with the majority of youth (57 percent) with special health care needs being male.<sup>5</sup>

Twenty-two percent of children with special health care needs ages 12-17 years old have health conditions that consistently and often greatly affect their daily activities, and close to 40 percent have conditions that parents rate as moderate or severe; yet, only 17 percent miss more than 11 days of school due to health problems.<sup>5</sup>

## Section 2: Youth Risk Behaviors

Engaging in unhealthy behaviors can lead to health consequences for youth, both while they are young and also as they age. Many behaviors that are formed early in life are likely to continue into adulthood. Some actions could have an immediate impact on an adolescent's health such as an unplanned pregnancy, contracting a sexually transmitted infection, or being injured in a car crash either while driving impaired or not wearing a seatbelt. Other health behaviors take longer to produce health problems such as smoking, overeating and lack of exercise. This section examines health behaviors that are most likely to lead to morbidity and mortality either during adolescence or later in the life span.

### Sexual Activity

Responsible sexual activity, defined for adolescents as either abstinence from sexual intercourse or the use of condoms and other birth control methods when sexual activity occurs, prevents unintended pregnancy and sexually transmitted diseases. Healthy People 2010 Objective 25-11 seeks to increase the proportion of adolescents who abstain from sexual intercourse or use condoms if currently sexually active to 95 percent. Nationwide the proportion of high school students who report ever having sexual intercourse has declined significantly from 1991 to 2007. However, the proportion who are currently sexually active, i.e., have had sexual intercourse within the last 3 months, has shown no change during this time.<sup>6</sup> The same is true for Colorado. From 1995 to 2005, the proportion of students who said that they ever had sexual intercourse decreased from 47 percent to 39 percent; the proportion who were currently sexually active has stayed constant at 31 and 30 percent respectively.<sup>4</sup> In 2009, 40 percent of Colorado students in public high schools had ever had sexual intercourse, not significantly different from 2005.<sup>4</sup>

Students who were currently sexually active were asked what one method that they or their partner used to prevent pregnancy before or during their last sexual intercourse. They were also asked as a separate question about whether or not they used a condom the last time. In 2005, proportionally more males (79 percent) reported using condoms than females (60 percent); more females (22 percent) reported using birth control pills than males (10 percent). The actual use of condoms and birth control pills may be higher if respondents to the survey only answered for themselves and not their partners; also males may not have known whether their partner was using birth control.<sup>7</sup>

### **Substance Use**

Using substances as an adolescent, such as tobacco, alcohol and other drugs, is a predictor of continued use or abuse as an adult. Table 15 provides data from 2005 which compares the current use (in the past 30 days) and ever used (lifetime usage) for both Colorado and the U.S.<sup>7</sup> The rates of use are similar, with Colorado youth having somewhat lower rates of current cigarette use.

**Table 15. Substance Use Among High School Students, Colorado and United States, 2005  
Percent Engaging in Current Use and Who Have Ever Used (Lifetime Usage)**

Substance Type	Colorado	United States
<b>Cigarettes</b>		
Current Use	<b>18.7%</b>	<b>23.3%</b>
Ever Used	<b>48.8%</b>	<b>54.3%</b>
<b>Alcohol</b>		
Current Use	<b>47.7%</b>	<b>43.3%</b>
Ever Used	<b>75.9%</b>	<b>74.3%</b>
<b>Marijuana</b>		
Current Use	<b>22.7%</b>	<b>20.2%</b>
Ever Used	<b>42.4%</b>	<b>38.4%</b>
<b>Cocaine</b>		
Current Use	<b>2.7%</b>	<b>3.4%</b>
Ever Used	<b>8.1%</b>	<b>7.6%</b>

Source: 2006 Colorado Healthy Kids Survey Report

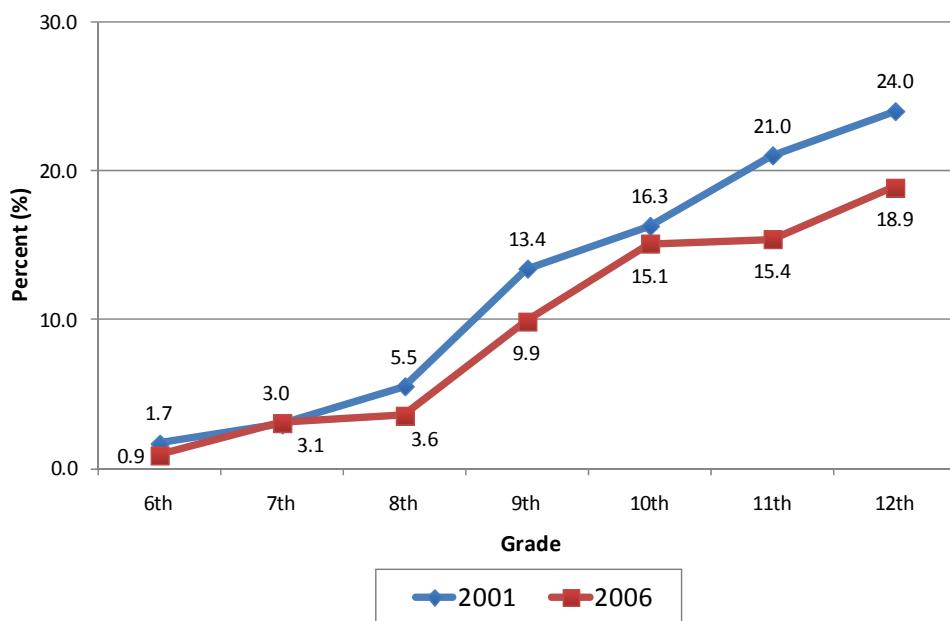
### Tobacco

Tobacco use is a leading cause of preventable mortality and morbidity in the U.S. Preventing tobacco use in adolescence is critical to ensure health over the lifetime, and almost half of adult smokers started smoking in high school. Healthy People 2010 Objective 27.2 is to reduce tobacco use by adolescents during the past month to 16 percent. Based on the 2005 Youth Risk Behavior Survey data above (Table 15), Colorado had not met this target. However, the Healthy Kids Colorado Survey on Tobacco and Health showed the prevalence of smoking in this age group had decreased to 15 percent in 2006, which did meet the Healthy People objective.<sup>8</sup>

Based on data from the Healthy Kids Survey on Tobacco and Health, the percentage of both middle and high school students who had ever smoked a cigarette decreased between 2001

and 2006.<sup>8</sup> In 2001, 26 percent of middle school students had ever smoked; in 2006, only 17 percent had ever smoked. The percentage of high school students who ever smoked decreased from 64 percent in 2001 to 43 percent in 2006. Current smoking rates among high school students decreased significantly, from 18 to 15 percent during this same time. No change was seen in current smoking rates among middle school students; three percent were current smokers in both years. Smoking prevalences for males and females were similar for both measures of smoking (ever smoked or currently smokes) in 2006.

The prevalence of current smoking increased with age (Figure 52) during both 2001 and 2006.<sup>8</sup> Smoking rates jumped between 8<sup>th</sup> and 9<sup>th</sup> grade, with 9<sup>th</sup> graders smoking at a rate three times the rate of the 8<sup>th</sup> graders. Also smokers in the 12<sup>th</sup> grade reported much higher prevalence than any other grade. In 2006, a significantly smaller percentage of students in grades 8, 9, 11, and 12 were current smokers, compared to results from 2001.



**Figure 52. Prevalence of Current Smokers in Middle and High School by Grade, Colorado, 2001 and 2006**

Source: Colorado Healthy Kids Survey on Tobacco and Health

Smoking frequency--combined with quantity of cigarettes smoked--indicate dependence on tobacco.<sup>8</sup> Both of these measures decreased among students between 2001 and 2006. In 2001, 20 percent of high school smokers in Colorado reported smoking 10 or more cigarettes a day, and by 2006 only 11 percent reported smoking 10 or more cigarettes a day. Students in 12<sup>th</sup> grade (19 percent) were most likely to smoke daily. Two other levels of frequency and quantity of smoking include “established” (those who smoked 100 or more cigarettes in their lifetime), and “frequent” (those who smoked on 20 or more days during the past 30 days).<sup>8</sup> In 2006, 56 percent of current high school smokers were classified as established smokers, and 44

percent were classified as frequent smokers. These two rates decreased from 2001 when 70 percent were established smokers and 51 percent were frequent smokers.

Among current high school smokers, 63 percent said that they had tried to quit smoking in the past year; up from 55 percent in 2001.<sup>8</sup> Female students (68 percent) were significantly more likely to attempt to quit than male students (59 percent). In 2006, among those high school students who were currently smoking despite attempting to quit in the past year, only 9 percent used any assistance in trying to quit smoking, such as nicotine replacement therapy, a support program, or medication. The previous proportion was higher in 2001: 14 percent used assistance in trying to quit in 2001. Similarly, the use of nicotine replacement therapy declined from 11 percent in 2001 to 5 percent in 2006.

Use of tobacco in forms other than cigarettes remains a health hazard to adolescents. Cigar use, for example, increased from 2001 to 2006. In 2006, 1 in 6 high school students (16 percent) had smoked a cigar in the past 30 days; up from 1 in 8 in 2001. Over 21 percent of high school males were current cigar smokers in 2006 compared to 11 percent of females. Smokeless tobacco use (chew and moist snuff, also known as spit tobacco) remained level from 2001 to 2006 although use of such products is highest among high school males. Twelve percent of high school males reported smokeless tobacco use in the past 30 days compared to 3 percent of high school females and middle school males and 1 percent of middle school females.<sup>8</sup>

All states including Colorado prohibit the sale of tobacco to minors under the age of 18. Colorado also prohibits furnishing tobacco product samples or single cigarettes to a minor, and cigarette vending machines are required to have lockout devices in public, youth-accessible places. Despite legal restrictions, underage smokers still manage to purchase cigarettes. Clerks are not required to ask for proof of age for purchase of tobacco products. In 2006 more than half of underage high school current smokers who tried to buy cigarettes were able to do so, similar to the percentage in 2001. In 2006, the two most common ways for underage smokers to get access to cigarettes were to have someone else buy the cigarettes for them or for someone else to give them cigarettes.<sup>8</sup>

Colorado law requires schools to be completely tobacco-free for students, staff, and visitors. However, more than one-third of middle school current smokers and half of high school current smokers reported smoking on school grounds at least once in the previous 30 days.<sup>8</sup>

### Alcohol

Rates of alcohol use by Colorado high school students are similar to those nationwide (Table 15). In 2005, 30 percent of students reported binge drinking, defined as 5 or more alcoholic drinks on one or more occasions in the past 30 days. Healthy People 2010 Objective 26-11 proposes to reduce the proportion of young persons engaging in binge drinking of alcoholic beverages to 25 percent. Colorado has not yet met this goal. As with cigarettes, alcohol use increases as students get older. In Colorado, during 2005, 61 percent of 12<sup>th</sup> graders reported that they drank alcohol during the past 30 days, nearly double that of 9<sup>th</sup> graders (33 percent).

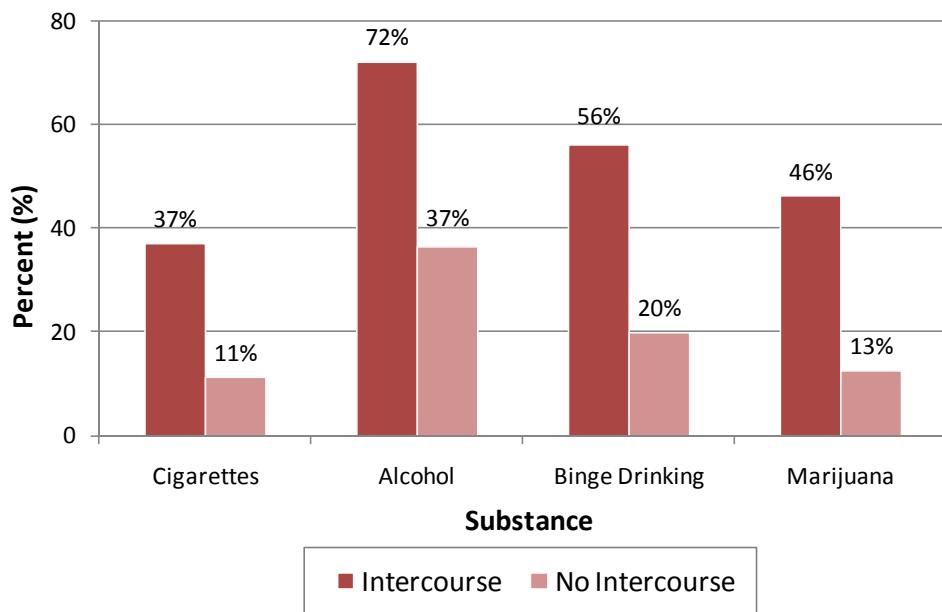
Rates of alcohol use are similar for males and females, but males (33 percent) are more likely to report using alcohol before the age of 13 than females (22 percent). Still, a large proportion of high school students experienced drinking before high school.<sup>7</sup>

### Marijuana

Healthy People 2010 Objective 26-10b proposes to reduce the proportion of high school students who used marijuana in the past 30 days to less than 1 percent. In 2005, Youth Risk Behavior Survey data show that close to 23 percent of Colorado students had used marijuana in that time period, a level of use well above the goal. More students use marijuana than use cigarettes. The highest rate of marijuana use was among 12<sup>th</sup> graders with over 35 percent reporting use in the last 30 days compared to 13 percent of 9<sup>th</sup> graders. Males were more likely to first use marijuana before age 13 (12 percent) than girls (8 percent).<sup>7</sup>

### Attitudes and Behaviors Associated with Substance Use

In 2005, among Colorado high school students, using tobacco, alcohol, or marijuana in the last 30 days was associated with being sexually active during the past three months (Figure 53).<sup>7</sup> Compared to high school students who were not sexually active during the past three months, sexually active students were almost twice as likely to drink alcohol in the past 30 days; nearly three times as likely to engage in binge drinking and cigarette use; and almost four times as likely to use marijuana. A similar pattern was observed for lifetime substance use and ever having had sexual intercourse.



**Figure 53. Prevalence of Substance Use in Past 30 Days among Colorado High School Students by Sexual Activity in Past Three Months, 2006**

Source: Healthy Kids Colorado Survey Report

The association between substance use and participation in sports among high school students has also been investigated.<sup>7</sup> For most substances, athletes were less likely to use substances than non-athletes but the difference in prevalence for athletes and non-athletes was small: for cigarettes, 17 percent of athletes smoked versus 22 percent of non-athletes; for alcohol, 45 percent of athletes were drinkers versus 51 percent of non-athletes; for binge drinking 29 percent of athletes admitted binging versus 34 percent of non-athletes; and for marijuana, 20 percent of athletes reported use versus 28 percent of non-athletes (2006). One exception is for smokeless tobacco products: athletes were close to twice as likely to use chewing tobacco (11 percent) as non-athletes (6 percent).<sup>7</sup>

### **Safety Behaviors**

Proper seat belt use can help to prevent fatal and non-fatal motor-vehicle related injuries. From 2004 to 2006, over 70 percent of youth 15-17 who died from motor-vehicle related injuries were not wearing a seat belt at the time of the crash.<sup>9</sup> Colorado law mandates that all adolescent drivers and passengers be restrained in a seat belt.<sup>10</sup> Healthy People 2010 Objective 15-19 seeks to increase the proportion of adolescents who wear seat belts to 84 percent. Based on self-report of seat belt use in the Youth Risk Behavior Survey, Colorado has just met that objective. In 2009, 84.5 percent of Colorado high school students reported wearing seatbelts always or most of the time.<sup>2</sup> Colorado does not have a primary safety belt law for those over age 17, which means that a driver can only be cited for belt use after being stopped for some other traffic offense.

Traumatic brain injury occurred in over half (54 percent) of all hospitalizations to bicyclists 15 to 19 years old from 2006 to 2008.<sup>11</sup> Wearing a bicycle helmet is the most effective way of preventing head injuries and fatalities due to bicycle-related crashes; approximately 85 to 88 percent of bicycle-related traumatic brain injuries could be prevented by helmet use.<sup>12</sup> Very few high school students use helmets. Of the 73 percent of students who had ridden a bicycle in the past year in 2005, 71 percent rarely or never wore a helmet.<sup>13</sup> If helmet use could increase to the level of seat belt use, bicycle-related injuries could be substantially reduced. The National Highway Traffic Safety Administration suggests that a law requiring the use of bicycle helmets, along with education and high-visibility enforcement is the most promising way to increase bicycle helmet use.<sup>12</sup> Colorado, currently, does not have a law requiring cyclists to wear bicycle helmets.

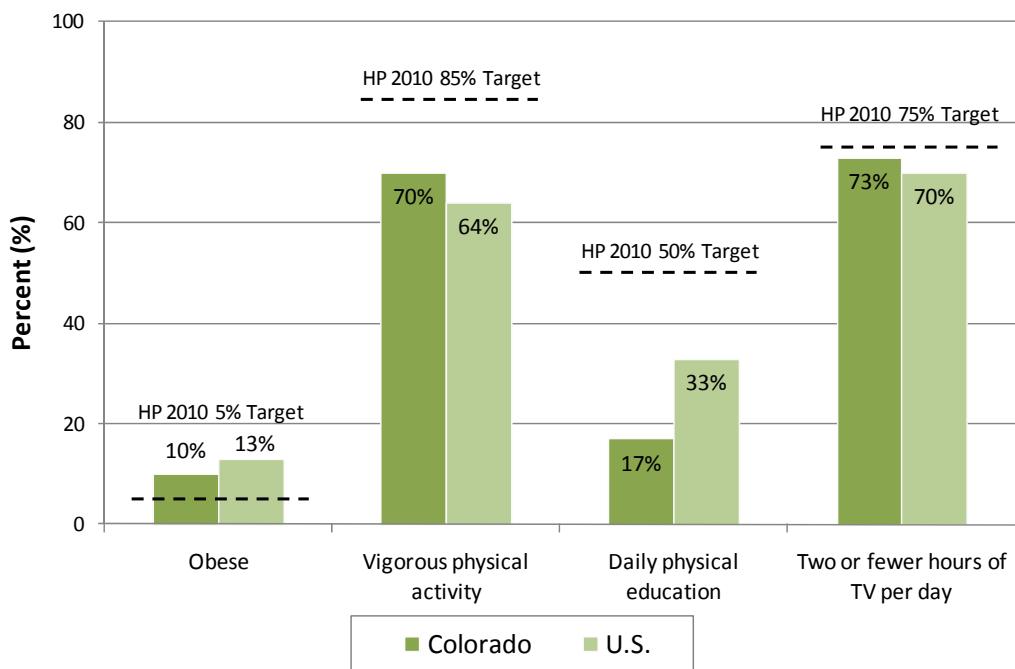
### **Health Behaviors to Prevent Chronic Disease**

Good nutrition and physical activity contribute to a reduced risk for development of a chronic disease in adulthood such as heart disease, cancer, and stroke. Together these promote a healthy weight and prevent overweight and obesity. Healthy People 2010 objectives which encourage healthy behaviors in adolescence include:

- Reduce the percent of obese adolescents who are at or above the sex- and age-specific 95<sup>th</sup> percentile of Body Mass Index (BMI) to 5 percent (Healthy People 2010 Objective 19-3b).

- Increase the percent of adolescents in grades 9 to 12 who engage in 20 minutes or more of vigorous activity 3 or more days per week to 85 percent (Healthy People 2010 Objective 22-7).
- Increase the proportion of adolescents who participate in daily school physical education to 50 percent (HP 22-9).
- Increase the proportion of adolescents who view television 2 or fewer hours on a school day to 75 percent (HP 22-11).

Figure 54 compares the results of the 2005 Colorado Youth Risk Behavior Survey on these measures to the national survey.<sup>1</sup> The current National Association for Sport and Physical Education recommendation is for 225 minutes per week of physical education in middle and high schools.<sup>31</sup> A survey of Colorado schools found that 85 percent of schools require that students take a physical education course, compared to 97 percent of schools nationwide,<sup>15</sup> yet only 17 percent of students report having daily physical education.<sup>13</sup> The most recent Centers for Disease Control recommendation encourages children and youth to participate in at least one hour per day of physical activity.<sup>14</sup> Having physical education classes available and encouraging student participation in such classes daily would facilitate meeting that recommendation. The chapter on Child Health discusses other community means to achieve this level of physical activity for all children and youth.



**Figure 54. Weight and Physical Activity Measures for High School Students in Colorado and the United States, 2005**

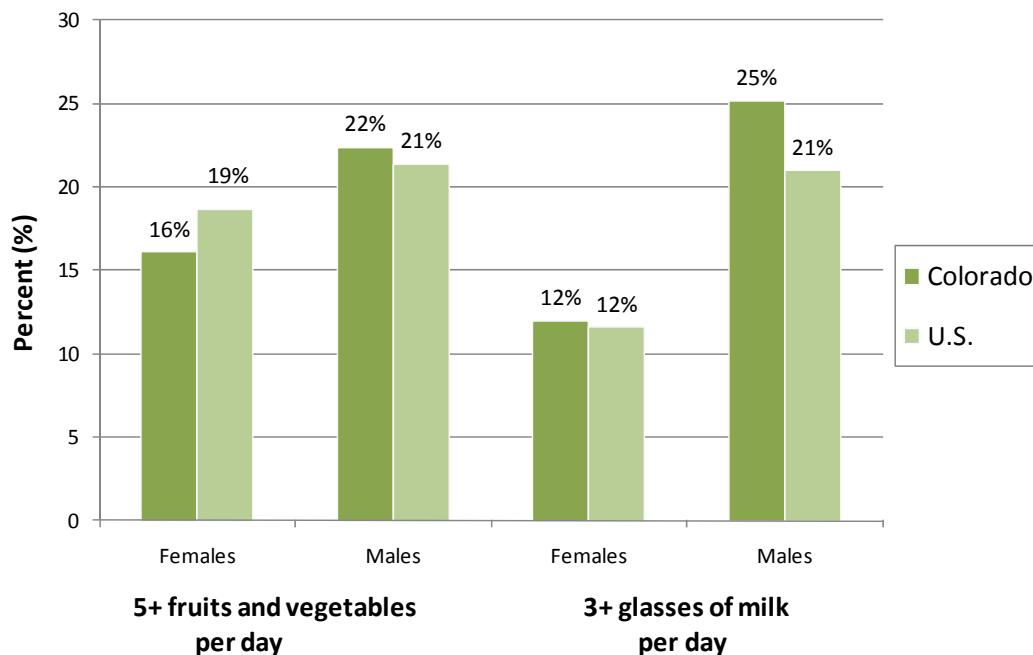
Source: Youth Risk Behavior Survey

Although Colorado's percentage of youth who are obese is relatively high compared to the Healthy People 2010 target, the issue of healthy weight needs to be emphasized among all students. A larger proportion of students than could be categorized as overweight report that they are trying to lose weight or view themselves as overweight. In 2005, this is especially true

for females in Colorado public high schools; 59 percent of female and 25 percent of male students report that they are trying to lose weight. Twenty-nine percent of females and close to 20 percent of males describe themselves as overweight.<sup>1</sup> In 2009, 22 percent of Colorado students in public high schools described themselves as slightly or very overweight, compared to 28 percent of students in the U.S.<sup>4</sup>

Many Colorado students reported using healthy strategies to maintain their weight or lose weight. In 2005, almost 65 percent of Colorado high school students said that they exercised and 37 percent reported eating fewer calories or more foods low in fat to maintain their weight or lose weight in the past 30 days. Females were more likely to report exercising (75 percent) and watching their calories (55 percent) than males (55 percent and 24 percent respectively). Five percent of female and 2 percent of male students in Colorado public high schools used purging methods (vomited or took laxatives) and 12 percent of females and 6 percent of males said that they went without eating for 24 or more hours to lose or maintain weight. Five percent of students took diet pills, powders, or liquids.<sup>1</sup>

Colorado high school students are not consuming all five of the recommended daily servings of fruits and vegetables (Figure 55). Sixteen percent of females and 22 percent of males in Colorado eat 5 or more servings of fruits and vegetables every day (2005 data), similar to the national rates. A similar pattern is observed for drinking three or more glasses of milk each day. Twelve percent of high school females in Colorado and the U.S. drink 3 or more glasses of milk a day. Compared to females in public high schools, a larger proportion of high school males drink milk (25 percent in Colorado and 21 percent in the U.S.).<sup>1</sup>



**Figure 55. Nutrition Measures for High School Students by Gender, Colorado and the United States, 2005**

Source: Youth Risk Behavior Survey

One way to encourage healthy eating is to limit the availability of unhealthy foods in the school environment. Colorado law mandates that schools have policies to ensure that at least 50 percent of all items offered in vending machines be healthful foods or beverages that meet acceptable nutritional standards. Over half of all middle and high schools allow students to purchase candy, salty snacks, cookies and soda pop in school venues, a level that is considerably higher than the 34 percent of schools nationwide.<sup>15</sup>

### **Section 3: Fatal and Non-Fatal Injuries**

One of the major causes of disability and death among adolescents is injury. Unintentional injuries, such as motor-vehicle related injuries, are the leading cause of death for adolescents ages 15-19 years old, accounting for 46 percent of 580 deaths during 2006-2008.<sup>16</sup> Death by suicide is the second leading cause of death among this age group, accounting for 20 percent (117 deaths) of the 580 deaths during 2006-2008.<sup>16</sup> Healthy People 2010 Objective 16-3 is to reduce deaths of adolescents ages 15 to 19 years old to 39.8 deaths per 100,000 adolescents. The 2006-2008 annual average death rate for adolescents in Colorado was 53.9 deaths per 100,000 adolescents, which is far above the Healthy People objective.<sup>17</sup>

#### **Injury**

Injury hospitalization and injury death rates are much higher in adolescence compared to childhood. Unintentional injury is the leading cause of death for adolescents accounting for 45 percent of all deaths to 15-17 year olds and 48 percent of deaths to 18-19 year olds.<sup>17</sup> Table 16 compares the injury death rates for Colorado and the U.S. for youth 15-19 in 2004-2006, the most recent data available for the U.S.<sup>16, 18</sup> Colorado has similar but slightly lower unintentional death rates. Intentional death rates are higher in Colorado due to the higher rates of suicide among males and females of this age compared to males and females nationally. The homicide death rates are lower for Colorado males than U.S. males; the female homicide rates are similar.

**Table 16. Injury Deaths Rates per 100,000 among Youth Ages 15-19, Colorado and the United States, 2004-2006**

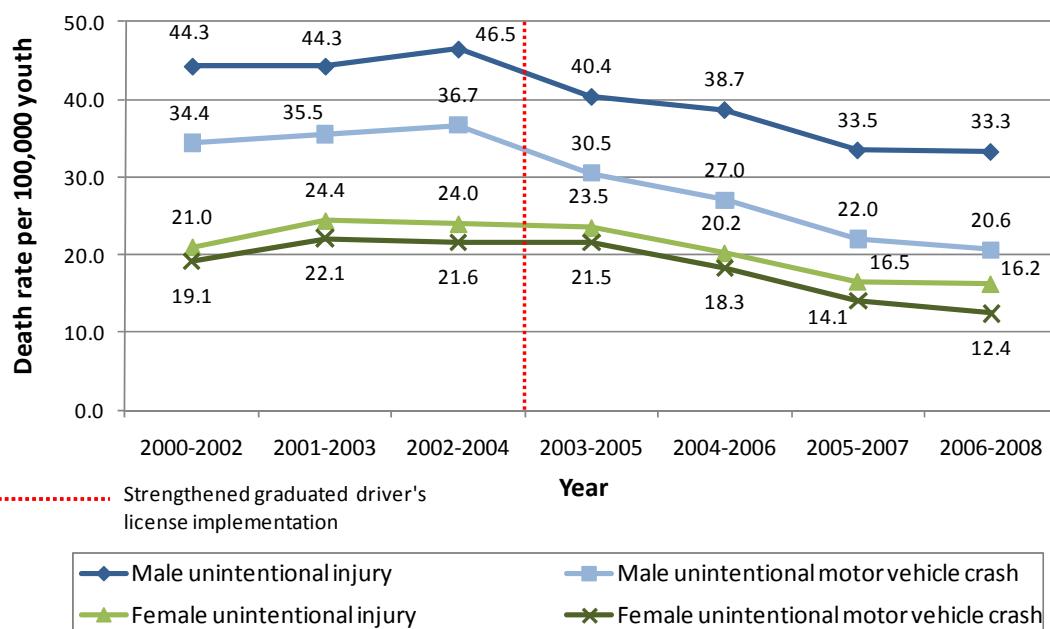
Injury Type	HP 2010	Colorado Rate			United States Rate		
		Target	Total	Male	Female	Total	Male
All injuries		50.0	69.3	29.5	50.6	74.0	26.0
Unintentional injuries	17.5	29.8	38.7	20.2	32.0	43.7	19.6
Motor vehicle injuries	9.2	22.8	27.0	18.3	24.1	31.2	16.5
Intentional injuries		19.2	28.9	8.8	17.9	29.2	6.0
Suicide	5.0	13.0	19.1	6.5	7.7	12.1	3.1
Homicide	3.0	5.8	9.1	2.4	10.1	16.8	2.8

Source: Colorado Health Information Dataset, Colorado Department of Public Health and Environment; Web-based Injury Statistics Query and Reporting System, Centers for Disease Control and Prevention

Overall, Colorado adolescents have not met the Healthy People 2010 targets for injury death rates for all populations (Table 16). As with younger children, male adolescents have higher injury death rates for all of these types of injuries than females. In fact, Colorado males are nearly twice as likely to die from unintentional injuries and over three times as likely to die from intentional injuries as females.

### **Unintentional Injury**

Rates of unintentional injury deaths and hospitalizations for Colorado adolescents ages 15-19 years old have been steadily declining since early in the decade. The 3-year average annual unintentional death rate for both males and females 15-19 years old during 2000-2002 in Colorado was 33.1 deaths per 100,000 youths. This rate declined to 25.0 in 2006-2008. The injury hospitalization rate declined from 430.6 hospitalizations per 100,000 youths to 304.8 during this same time period. The decrease in both rates is mainly due to decreasing deaths and hospitalizations from motor vehicle-related incidents, which account for 60 percent of all unintentional injury deaths and 56 percent of all unintentional injury hospitalizations. Figures 56 and 57 show the declining rates of motor vehicle crash deaths and hospitalizations by gender from 2000-2002 to 2006-2008. These results show that while the motor vehicle crash death rates rose for both males and females from 2000-2002 to 2002-2004 the rate declined over 40 percent from 2002-2004 to 2006-2008. Hospitalization rates also declined at a steeper rate after the passage of the strengthened graduated driver's license law.

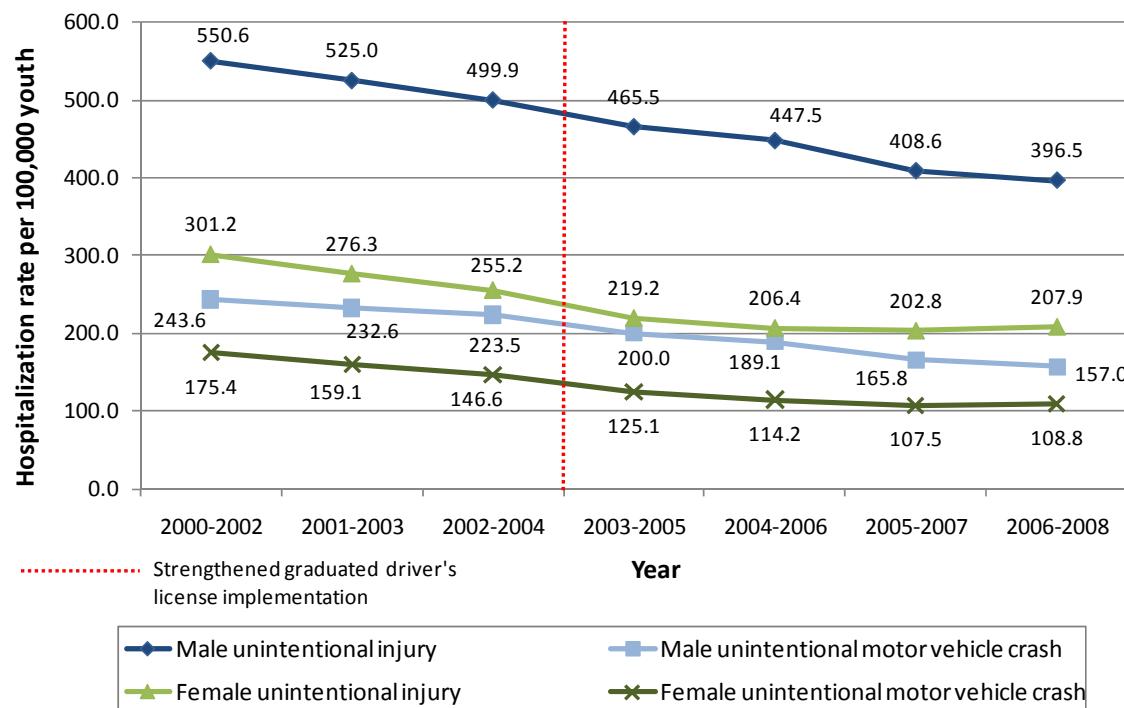


**Figure 56. Total Unintentional Injury and Motor Vehicle Crash Injury Death Rates for Youth Ages 15-19 by Sex, Death Certificates, Colorado, 2000-2002 to 2006-2008**

Source: Colorado Department of Public Health and Environment, Death Certificate Data

One possible contributor to the decline is the graduated driver's license law (GDL) that was first put into place in 1999 but was strengthened in 2005. The strengthened law is a three-stage

system (learner's permit, restricted or provisional license, and full licensure) for phasing in on-road driving so that beginners obtain their initial driving experience under low-risk conditions. In addition to the three stages Colorado's law includes passenger and nighttime restrictions.<sup>10</sup> The law also provided for intensive education efforts in 2004 before the GDL actually took effect in 2005.



**Figure 57. Total Unintentional Injury and Motor Vehicle-Related Injury Hospitalization Rates for Youth Ages 15-19 by Sex, Injury Hospitalization Data, Colorado, 2000-2002 to 2006-2008**

Source: Colorado Department of Public Health and Environment, Death Certificate Data

The risk of being in an alcohol-related motor-vehicle crash is greater for younger people than older people at every level of blood alcohol level.<sup>19</sup> In 2004 to 2006, drugs or alcohol were involved in almost 81 percent of motor-vehicle related fatalities to youth ages 15- 17 years old.<sup>9</sup> Colorado has adopted a zero tolerance blood alcohol level, making it illegal for persons under the age of 21 to drive with any measurable amount of alcohol in their blood.<sup>10</sup> Healthy People 2010 Objective 26-06 is to reduce to 30 percent the proportion of adolescents who report that they rode in the past 30 days with a driver who had been drinking alcohol. Based on YRBS data for 2009, Colorado youth meet that objective. Only seven percent of high school students in Colorado reported driving after drinking alcohol within the past 30 days, and 25 percent said that they had ridden with someone who had been drinking within the past 30 days in 2009.<sup>4</sup>

Legislation effective in December, 2009, prohibits youth under the age of 18 from using a cell phone while driving.<sup>20</sup> Further analysis will be needed in the future to evaluate what impact this law has on teen motor-vehicle related injuries.

## Bicycle-Related Injuries

Injuries from bicycle-related crashes have not changed since 2000. Between 2006 and 2008, there were 150 hospitalizations due to such injuries, resulting in a three-year annual average rate of 12.3 per 100,000 population age 15 to 19 years old.<sup>11</sup> Males were 5 times more likely to be hospitalized for bicycle-related injuries (a rate of 20.1) than females (a rate of 4.0). Injury hospitalizations give a picture of only those mostly severely injured and do not capture the extent of injuries to all bicyclists. Based on emergency department data at the national level, only 3 percent of youth 15-19 years old seen in the emergency department for bicycle-related injuries were hospitalized, which suggests that hospitalization data undercounts all bicycle-related injuries requiring medical care and that hospitalization data represent more severe injuries.<sup>18</sup>

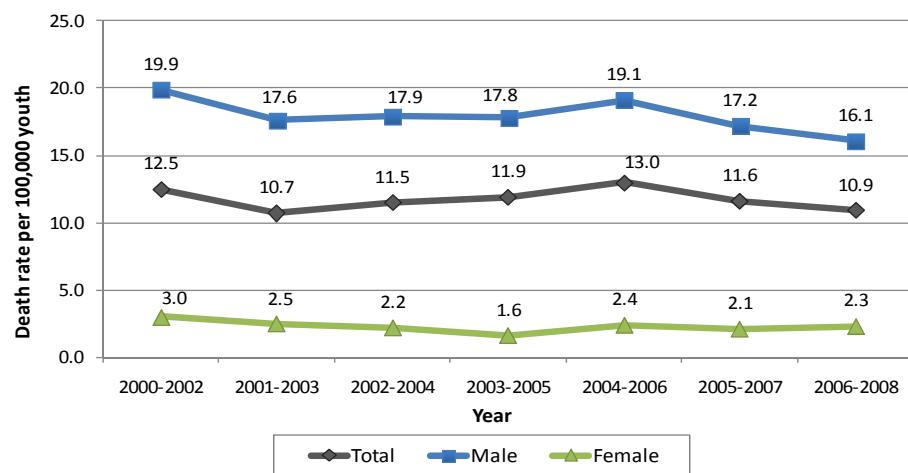
## Intentional Injury

Intentional injuries are those due to self-harm or deliberate harm by others. The two leading major causes of intentional injury are suicide and homicide.

### Suicide

Suicide is the second leading cause of death in Colorado for youth ages 15-19 years old. Both males and females have higher rates of suicide deaths compared to the nation (Table 16). Adolescent males have higher rates of suicide deaths than females while females had higher rates of hospitalizations due to suicide attempts. Figures 58 and 59 show that the suicide death rate has declined very little for both males and females in recent years but hospitalizations due to suicide attempts have decreased 13 percent for males and 20 percent for females since 2000-2002.<sup>11, 16</sup>

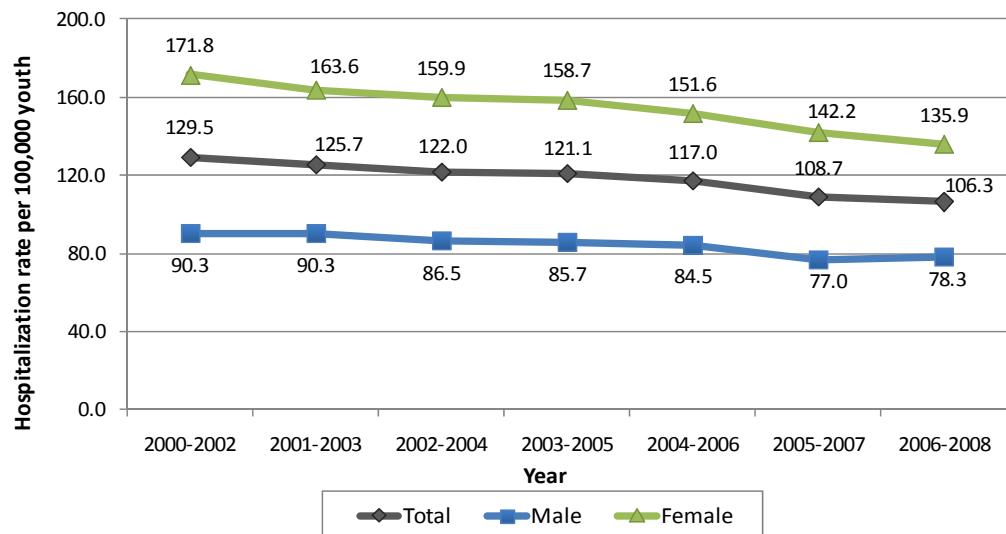
Suicide death rates vary from year to year and do show a slight decrease in 2005-2007 and 2006-2008 compared to 2004-2006. Yet, it is unclear if this was a true decrease or just random variation. Data from future years will be needed to determine if a true decline in suicide deaths has started.



**Figure 58. Suicide Death Rates for Youth Ages 15-19 by Sex, Death Certificates, Colorado, 2000-2002 to 2006-2008**

Source: Colorado Department of Public Health and Environment, Death Certificate Data

There is a reduction in hospitalizations due to suicide attempts (Figure 59).<sup>11</sup> It is uncertain whether the actual total number of attempts declined or whether those who had attempted suicide were less likely to be hospitalized over this period of time. (Data from emergency departments and outpatient settings on suicide attempts are not easily available to evaluate whether total suicide attempts have declined.) Based on self-reports from high school students in Colorado, the percentage of students who attempted suicide (one or more times during the 12 months before the survey) did not decline from 2005 to 2009. Specifically, the results from the Youth Risk Behavior Survey indicate that 7 percent attempted suicide as reported in 2005 and just under 8 percent attempted suicide in the 12 months prior to being surveyed in 2009.<sup>4</sup> Healthy People 2010 Objective 18-2 seeks to decrease suicide attempts requiring medical attention to 1 percent. Also from this survey, 14 percent of Colorado high school students reported in 2005 and 2009 that they seriously considered attempting suicide during the 12 months before the survey. In contrast, 17 percent of U.S. high school students in 2005 and 14 percent in 2009 reported that they considered attempting suicide within the past 12 months.<sup>4</sup>



**Figure 59. Total Attempted Suicide Hospitalization Rates for Youth Ages 15-19 by Sex, Injury Hospitalization Data, Colorado, 2000-2002 to 2006-2008**

Source: Colorado Health Information Dataset, Colorado Department of Public Health and Environment

Based on data from the Colorado Violent Death Reporting System, a study of suicides of all ages in Colorado between 2004 and 2008 showed that suicide among males was associated with problems with alcohol, issues with an intimate partner, job problems, and criminal/legal issues. Suicides among females were associated with a previous diagnosis of a mental health problem, a history of suicide attempt, a relationship problem with someone who was not an intimate partner, and the suicide or death of a friend or family member within the past five years.<sup>21</sup>

### Assaults and Homicide

The homicide death rate among adolescents age 15-19 in Colorado continues to be lower than the national rate but has not reached the Healthy People 2010 objective of 3 per 100,000

(Table 16). The difference between the Colorado death rate (5.8) and the national death rate (10.1) is primarily due to a lower male homicide rate (9.1 for Colorado, 16.8 for the nation).<sup>16, 18</sup> In fact, the homicide rate has declined further for Colorado males since the 2004-2006 data shown in the table; in 2006-2008 the male homicide rate declined to 7.2. These data should be tracked in future years to see whether this reduction is a random variation in rates or a true downturn in homicide among males. The same decline was not seen for females but the 2.3 rate in 2004-2006 meets the Healthy People 2010 objective.

Unlike suicide, hospitalizations due to assaults are much higher for male than female adolescents. In 2006-2008 the hospitalization rate was 72.3 per 100,000 males age 15-19 and 14.7 for females of the same age.<sup>11</sup> These rates have fluctuated but have not changed significantly since 2000-2002.

Deaths and hospitalizations do not measure the full impact of violence and assault on Colorado youth. Physical fights usually do not result in hospitalizations and are not measured through hospitalization data. Instead, the Youth Risk Behavior Survey provides data for Healthy People 2010 Objective 15-38, which seeks to reduce to 32 percent or fewer the 9<sup>th</sup>- to 12<sup>th</sup>- graders who have engaged in a physical fight. In 2009, 42 percent of males and 22 percent of females reported being in a physical fight in the previous 12 months.<sup>4</sup> In 2009, approximately 9 percent of high school students reported being hit, slapped, or physically hurt on purpose by a boyfriend or girlfriend in the past year; this rate was similar for males and females. In 2009, 25 percent of males and close to 8 percent of females reported carrying some type of weapon, e.g., knife, gun, or club, at least once in the past 30 days. In comparison, Colorado high school students report that a lower percentage carried a weapon on school property (at least one day during the past 30 days before the survey). Specifically, 8 percent of the males and 3 percent of the females in Colorado in 2009 carried a weapon onto school property.

In Colorado from 2006 to 2008 there were 87 deaths and 173 hospitalizations due to firearms among youth ages 15-19 years old.<sup>16</sup> The Healthy People 2010 Objective 15-3 is to reduce the rate of firearm deaths to 4.1 per 100,000. For adolescents, the rate was twice that at 8.1. Furthermore, adolescent males are much more likely to be hospitalized or to die by firearms than females. In 2006-2008, close to 84 percent of all firearm deaths and 90 percent of firearm hospitalizations for 15-19 year olds were to males. The suicide death rate from firearms was seven times higher for males (7.4) compared to females (1.0). It is also important to note for adolescent males that the firearm-related suicide death rate (7.4 per 100,000) is higher than the firearm-related hospitalization rate following suicide attempt (1.4). These data point to the lethality of firearms as a means to suicide.

Young women are more likely than young men to be victims of sexual assault. In 2009 11 percent of female high school students in Colorado and 4 percent of males reported that they been physically forced at some point in their lives to have sexual intercourse when they did not want it.<sup>4</sup>

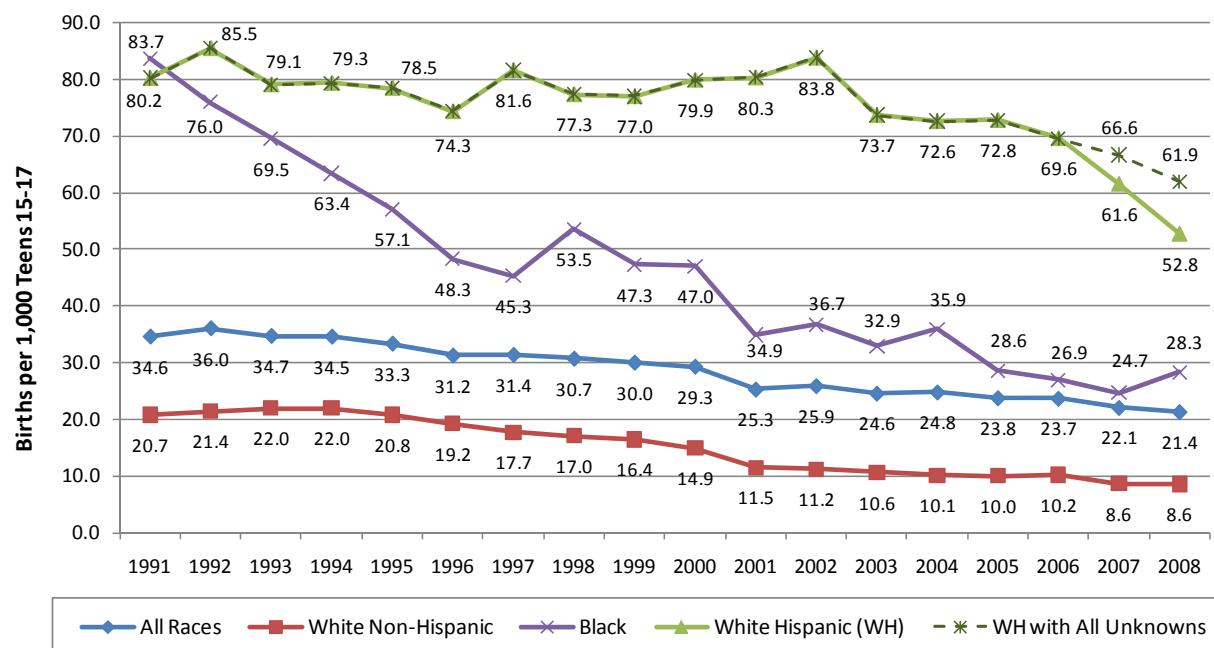
## Section 4: Reproductive Health

Responsible sexual activity for adolescents (either abstinence from sexual intercourse or the use of condoms and other birth control methods) prevents unintended pregnancy and sexually transmitted diseases.

### Teen Fertility

Healthy People 2010 Objective 9-7 proposes to reduce pregnancies to 43 per 1,000 females ages 15 to 17. This goal includes pregnancies that result in live births, induced and spontaneous abortions. The National Center for Health Statistics estimates that about half (55 percent) of all pregnancies for this age group result in live births.<sup>22</sup> Due to the difficulty in accurately measuring abortions, the data commonly used to measure fertility are limited to births documented by birth certificates.

Figure 60 illustrates a decreasing trend in the fertility rate of adolescents, (the number of live births per 1,000 15-17 year olds), beginning in the 1990s and continuing to 2008 (the latest available data).<sup>23</sup> Since 2000, the fertility rate for all races dropped by 27 percent overall, 42 percent for White/Non-Hispanic females, 40 percent for Black/African American females, and at least 23 percent for White/Hispanic females. Beginning in 2007, the methods used to code ethnicity changed, and a larger portion of births were coded as "ethnicity unknown," which may in part explain the large drop in the fertility rate among White/Hispanic females between 2006 and 2008 (lower green line). In the figure below for years 2007 and 2008, the top dashed line represents the estimated White/Hispanic fertility rate if all births of unknown ethnicity were assumed to be of Hispanic origin.



\*The White Hispanic rate beginning in 2007 is based on a new classification of race/ethnicity which understates Hispanic births compared to births in earlier years. The dashed line shown assumes all births of unknown ethnicity are Hispanic.

**Figure 60. Fertility Rates among Females Ages 15-17, by Race/Ethnicity, Colorado, 1991-2008**

Source: Colorado Department of Public Health and Environment, Birth Certificate Data

Unintended pregnancies are more likely to result in poor birth outcomes and the pregnancies of young women ages 15 to 19 are more commonly unintended. From 2006 through 2008, 36 percent of pregnancies resulting in a live birth were intended for this age group, compared to 70 percent of pregnancies for women ages 25 to 34, and 77 percent for women ages 35 and older.<sup>24</sup>

### **Sexually Transmitted Infections**

Sexually active adolescents are also at risk for sexually transmitted infections (STI) including chlamydia and gonorrhea. Cases of these two STIs are reported to the Colorado Department of Public Health and Environment's STI/HIV Surveillance Program. Between 2003 and 2007 (the latest available data), there was a significant increase in the incidence of both chlamydia and gonorrhea cases in all age groups statewide. The number of chlamydia cases increased by 33 percent and the number of gonorrhea cases increased by 22 percent (while the population increased by only 4 percent). It is unknown whether these increases represent a true rise or an increase in screening, especially among females.<sup>25</sup> Eighty-two percent of cases of chlamydia and 72 percent of cases of gonorrhea in adolescents occurred in females.

Chlamydia is the more prevalent of the two STIs. In 2007, there were 5,389 cases of chlamydia among Colorado teens ages 15-19 compared to 799 cases of gonorrhea. During the same time period, over 97 percent of cases occurred among people of reproductive age (15-44), and while the 15 to 19 year old age group comprised 17 percent of that population, they accounted for 31 percent of the chlamydia cases and 24 percent of the gonorrhea cases statewide.<sup>26</sup>

## **Section 5: Access to Care**

Health insurance increases access to health care. A Healthy People 2010 objective proposes to increase to 100 percent the proportion of all people with health insurance. Data from the National Survey of Children's Health in 2007 suggest that 86 percent of Colorado youth ages 12-17 years old have health insurance at any given time; 69 percent have private insurance and 17 percent have public insurance.<sup>3</sup> Of those with any kind of health insurance, 74 percent reported adequate insurance, that is, the insurance offered benefits that met the youth's needs and allowed the youth to see the desired health care provider with reasonable out-of-pocket expenses. Fewer youth with special health care needs reported adequate insurance (61 percent).<sup>3</sup> In order to evaluate whether children with special health care needs were getting the care that they needed, the National Survey of Children with Special Health Care Needs asked about 15 specific health care services.<sup>5</sup> The questions asked if the service was needed, and if needed, if the child received the service. Almost 82 percent of youth ages 12-17 years old with special health care needs received needed services. Youth with special health care needs often need referrals for specialist care or services; 72 percent of families with older children with special health care needs reported that they had no problems getting the referrals they needed.

## **Medical Home**

Beyond access to care, a medical home is a team approach to providing quality, comprehensive primary health and related services. A medical home includes primary care and is “accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective.”<sup>27</sup> Over half of all Colorado youth ages 12-17 years old (53 percent) receive care in what would be considered a medical home. Eighty-two percent did see a health care provider for preventive medical care in the last 12 months, and 88 percent saw a dentist for preventive dental care.<sup>3</sup>

One marker of quality health care for children with special health care needs is that families receive family-centered care. Family-centered care includes the following approach by health care providers:

- spending enough time with families
- listening carefully
- providing needed information
- helping families to feel like partners
- being culturally sensitive
- using interpreters when needed

An estimated 66 percent of families of youth with special health care needs ages 12-17 received family-centered care.<sup>5</sup>

## **School-Based Health Centers**

Locating health services within schools can improve access to comprehensive medical and mental health services for all children. School-based health centers complement services provided by school nurses and include direct clinical services such as physical exams, immunizations, mental health and substance abuse services, and care for acute illness, injury and chronic disease.<sup>28</sup> The centers also provide health promotion and disease prevention programs for all students, not just those seen for direct services. The presence of school-based health centers has been associated with decreased fertility rates among Black/African American adolescents in Denver Public Schools.<sup>29</sup>

During the 2008-2009 school year, 40 school-based health centers in Colorado were supported through the Colorado Department of Public Health and Environment’s School-Based Health Center Program; these included sites at eight elementary schools, one kindergarten through eighth grade school, 14 middle schools, and 17 high schools. Mobile school-based clinics not funded by this program were also available to five elementary, five middle, and one high school in Arapahoe and Adams counties.<sup>30</sup> Year-end data from the 40 programs funded show that these programs served 23,635 students, approximately 3 percent of the total public school population in Colorado. Each student averaged 3.5 visits during the school year. The majority of students served were low-income (40 percent had Medicaid or Child Health Plan Plus) or uninsured (35%).

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